

## REMARKS

Claims 1-3 and 9 stand rejected under 35 U.S.C. 103(a) as being obvious over Sugaya et al. (Japan Patent Document No. 4-162505) in view of Callister “Materials Science and Engineering An Introduction”, 1985, pages 49-50. Applicants traverse the rejection because the cite references do not disclose or suggest, among other things, a magnetic thin film that has one or more kinds of elements M selected from the elemental group of Al, B, Ga, Si, Ge, Y, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W and Rh, wherein the total content of the M elements is not less than 1 atomic% and not more than 10 atomic%.

In the Response to Arguments of the outstanding Office Action (Part of Paper No. 01152004), the Examiner asserts that Applicants’ argument about Sugaya’s element M being totally different from that of the present invention is not persuasive because Sugaya teaches element M is a Group 3A element from the Periodic Table. The Examiner further asserts that Group 3A of the Periodic Table includes the elements B and Al, which are encompassed by the instant claims. Applicants traverse this statement of the Examiner because the Examiner is using the CAS Group system of the Periodic Table to select elements, but Sugaya teaches Group 3A elements based on another Group system.

Sugaya teaches elements M as being one or more kinds of Group 3A elements based on the old IUPAC system. As discussed in Exhibits A and B, which are webpages of the environmentalchemistry.com website, three Group systems of the Periodic Table of elements exist. Namely, a new IUPAC Group system, an old IUPAC Group system, and a CAS system. The marked-up copy of exhibit C of the Periodic

Table identifies the Group name for each of the Group systems. Under the old IUPAC system, B and Al elements are Group IIIB elements. Accordingly, the elements M disclosed by Sugaya, which are the Group IIIA of the old IUPAC system, are different from the elements M disclosed by the elements recited in the claims of the present invention. That is, elements M disclosed in Table 1 of Sugaya, such as Y, Sc, and La are different than the present invention. For these reasons, withdrawal of the §103 rejection is respectfully requested.


Claims 4-6 and 10 stand rejected under 35 U.S.C. 103(a) as being obvious over Sugaya in view of Callister, and further in view of Westwood (U.S. Patent No. 6,224,719). The arguments recited above with respect to the rejection of claims 1-3 and 9 are reasserted herein. More specifically, Westwood is merely cited by the Examiner as teaching the claimed magnetic head structure. Since Westwood also fails to overcome the deficiencies of the cited references, withdrawal of the §103 rejection is respectfully requested.

For all of the foregoing reasons, Applicants submit that this Application is in condition for allowance, which is respectfully requested. The Examiner is invited to contact the undersigned attorney if an interview would expedite prosecution.

Respectfully submitted,

GREER, BURNS & CRAIN, LTD.

By

  
Joseph P. Fox

July 20, 2004

300 South Wacker Drive - Suite 2500  
Chicago, Illinois 60606  
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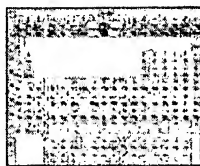
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## Periodic Table of Elements



This periodic table of elements provides comprehensive data on the chemical elements including scores of properties, element names in many languages and most known nuclides (Isotopes). Below the table there is a "**Chemical Elements Sorted By**" section with links that will sort chemical elements by various properties.

### What's New

**[2004-06-08]:** We've added a new article to our environmental section titled [A Brief History of Asbestos Use and Associated Health Risks](#). This article is the first of a series of articles we will publish this summer relating to asbestos--stay tuned.

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**[2003-09-10]** Many elements now include a page of common chemicals and chemical formulas that contain the given element. These chemical compounds in turn are linked to a page that contains more information on the chemical compound. As the underlying chemical database is a work in process, some chemicals will have very detailed information while others will have only basic information.

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### Periodic Table of Elements

| Periods | Groups          |                 |                 |                 |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
|---------|-----------------|-----------------|-----------------|-----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|         | 1               | 2               | 3               | 4               | 5              | 6               | 7               | 8               | 9               | 10              | 11              | 12              | 13              | 14              | 15              | 16              | 17              | 18              |
|         | IA              | IIA             | IIIA            | IVA             | VA             | VIA             | VIIA            | VIIIA           |                 |                 | IB              | IIB             | IIIB            | IVB             | VB              | VIB             | VIIIB           | VIII            |
|         | IA              | IIA             | IIIB            | IVB             | VB             | VIB             | VIIIB           | VIII            |                 |                 | IB              | IIB             | IIIA            | IVA             | VA              | VIA             | VIIA            | VIIIA           |
| 1       | 1<br><b>H</b>   |                 |                 |                 |                |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 | 2<br><b>He</b>  |
| 2       | 3<br><b>Li</b>  | 4<br><b>Be</b>  |                 |                 |                |                 |                 |                 |                 |                 |                 |                 | 5<br><b>B</b>   | 6<br><b>C</b>   | 7<br><b>N</b>   | 8<br><b>O</b>   | 9<br><b>F</b>   | 10<br><b>Ne</b> |
| 3       | 11<br><b>Na</b> | 12<br><b>Mg</b> |                 |                 |                |                 |                 |                 |                 |                 |                 |                 | 13<br><b>Al</b> | 14<br><b>Si</b> | 15<br><b>P</b>  | 16<br><b>S</b>  | 17<br><b>Cl</b> | 18<br><b>Ar</b> |
| 4       | 19<br><b>K</b>  | 20<br><b>Ca</b> | 21<br><b>Sc</b> | 22<br><b>Ti</b> | 23<br><b>V</b> | 24<br><b>Cr</b> | 25<br><b>Mn</b> | 26<br><b>Fe</b> | 27<br><b>Co</b> | 28<br><b>Ni</b> | 29<br><b>Cu</b> | 30<br><b>Zn</b> | 31<br><b>Ga</b> | 32<br><b>Ge</b> | 33<br><b>As</b> | 34<br><b>Se</b> | 35<br><b>Br</b> | 36<br><b>Kr</b> |
| 5       | 37              | 38              | 39              | 40              | 41             | 42              | 43              | 44              | 45              | 46              | 47              | 48              | 49              | 50              | 51              | 52              | 53              | 54              |

|   |                 |                 |                 |   |                  |                  |                  |                  |                  |                  |                   |                   |                   |                 |                   |                  |                   |                  |                   |
|---|-----------------|-----------------|-----------------|---|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|-------------------|-------------------|-----------------|-------------------|------------------|-------------------|------------------|-------------------|
|   | <b>Rb</b>       | <b>Sr</b>       | <b>Y</b>        |   | <b>Zr</b>        | <b>Nb</b>        | <b>Mo</b>        | <b>Tc</b>        | <b>Ru</b>        | <b>Rh</b>        | <b>Pd</b>         | <b>Ag</b>         | <b>Cd</b>         | <b>In</b>       | <b>Sn</b>         | <b>Sb</b>        | <b>Te</b>         | <b>I</b>         | <b>Xe</b>         |
| 6 | 55<br><b>Cs</b> | 56<br><b>Ba</b> | 57<br><b>La</b> | 1 | 72<br><b>Hf</b>  | 73<br><b>Ta</b>  | 74<br><b>W</b>   | 75<br><b>Re</b>  | 76<br><b>Os</b>  | 77<br><b>Ir</b>  | 78<br><b>Pt</b>   | 79<br><b>Au</b>   | 80<br><b>Hg</b>   | 81<br><b>Tl</b> | 82<br><b>Pb</b>   | 83<br><b>Bi</b>  | 84<br><b>Po</b>   | 85<br><b>At</b>  | 86<br><b>Rn</b>   |
| 7 | 87<br><b>Fr</b> | 88<br><b>Ra</b> | 89<br><b>Ac</b> | 2 | 104<br><b>Rf</b> | 105<br><b>Db</b> | 106<br><b>Sg</b> | 107<br><b>Bh</b> | 108<br><b>Hs</b> | 109<br><b>Mt</b> | 110<br><b>Uun</b> | 111<br><b>Uuu</b> | 112<br><b>Uub</b> |                 | 114<br><b>Uuq</b> |                  | 116<br><b>Uuh</b> |                  | 118<br><b>Uuo</b> |
| 6 |                 |                 |                 | 1 | 58<br><b>Ce</b>  | 59<br><b>Pr</b>  | 60<br><b>Nd</b>  | 61<br><b>Pm</b>  | 62<br><b>Sm</b>  | 63<br><b>Eu</b>  | 64<br><b>Gd</b>   | 65<br><b>Tb</b>   | 66<br><b>Dy</b>   | 67<br><b>Ho</b> | 68<br><b>Er</b>   | 69<br><b>Tm</b>  | 70<br><b>Yb</b>   | 71<br><b>Lu</b>  |                   |
| 7 |                 |                 |                 | 2 | 90<br><b>Th</b>  | 91<br><b>Pa</b>  | 92<br><b>U</b>   | 93<br><b>Np</b>  | 94<br><b>Pu</b>  | 95<br><b>Am</b>  | 96<br><b>Cm</b>   | 97<br><b>Bk</b>   | 98<br><b>Cf</b>   | 99<br><b>Es</b> | 100<br><b>Fm</b>  | 101<br><b>Md</b> | 102<br><b>No</b>  | 103<br><b>Lr</b> |                   |

**Key****Physical States etc.**

States are at normal temperature and pressure.

|           |                |           |  |
|-----------|----------------|-----------|--|
| <b>Xx</b> | <b>Gases</b>   | <b>Xx</b> | <b>Solids</b>                          |
| <b>Xx</b> | <b>Liquids</b> | <b>Xx</b> | <b>Synthetically prepared elements</b> |

**Groups**

New IUPAC system

Old IUPAC system (primarily in Europe)

CAS system (primarily in North America)

**Series**

| Metals        |                     |                              |                   |        |            | Nonmetals |          |              |  |
|---------------|---------------------|------------------------------|-------------------|--------|------------|-----------|----------|--------------|--|
| Alkali Metals | Alkali Earth Metals | Inner-Transition Lanthanides | Transition Metals | Metals | Metalloids | Nonmetals | Halogens | Noble Gasses |  |
|               |                     | Actinides                    | Transactinides    |        |            |           |          |              |  |

**Chemical Elements Sorted By:**

- [Atomic Radius](#)
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- [Cross Section](#)
- [Crystal Structure](#)
- [Density](#)
- [Electrical Conductivity](#)
- [Electronegativity \(Pauling\)](#)
- [Heat of Vaporization](#)
- [Ionic Radius](#)
- [Ionization Potential](#)
- [Mass Average](#)
- [Melting Point \(Freezing Point\)](#)
- [Name \(English\)](#)
- [Series](#)
- [Symbol](#)
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Answers many questions regarding atoms, including: atomic number, atomic mass (atomic weight), nuclides (isotopes), atomic charge (Ions), and energy levels (electron shells).

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Defines most of the technical terms and acronyms used on this site as well as many others.

### **The Chemistry of Polychlorinated Biphenyls**

PCB, the Manmade Chemicals That Won't Go Away

### **Molar Mass Calculations and Javascript Calculator**

Explains how to calculate molar mass and has a Javascript molar mass calculator, which can be used to verify molar mass calculations.

### **Molarity, Molality and Normality**

Introduces stoichiometry and explains the differences between molarity, molality and normality.

## Related readings and resources

*NOTE: Book title links open a popup window to Amazon.com*

### **Periodic Table of Elements Bibliography**

Reference resources used to compile and verify data used to generate these pages.

### **The Periodic Kingdom: A Journey into the Land of the Chemical Elements**

by P. W. Atkins, HarperCollins May 1997

### **Mendeleyev's Dream: The Quest For the Elements**

by Paul Strathern, St Martins Pr (Trade) April 2001

### **March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure, 5th Edition**

by Michael Smith, Jerry March, John Wiley & Sons January 2001

### **The Periodic Table,**

by Primo Levi, et al., Random House. 1996

### **Power of the Periodic Table,**

by Roy Timmreck, Royal Palm Pub. 1991

### Turning Point

Environmental Justice and the NIMBY Principle

From Bhopal to Hazardous Waste Compliance

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|                           |   |
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HM-206 Alters Requirements

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USDOT HazMat Transportation Placards  
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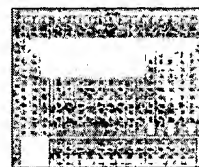
USDOT HazMat

**Physical Chemistry and the Periodic Table CD ROM Package,**

by Robert G. Mortimer, Addison Wesley Publishing Co. 1998

**CRC Handbook of Laboratory Safety, 5th edition,**

by A. Keith Furr, CRC Press April 2000

Placarding Quiz

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**Providing a Link**

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## Chemistry & Environmental Dictionary

### Gamma Ray - Group

**Gamma Ray:** extremely short wavelength and intensely high-energy electromagnetic radiation. Gamma rays originate from an atom's nucleus and normally accompany alpha and beta particles as part of the emissions of the radioactive decay of an atom and always accompany nuclear fission. Because gamma rays are energy and not matter, they are very penetrating and can cause damage to animal and plant tissues. Gamma rays are absorbed by extremely dense materials like lead (Pb) and depleted uranium (U).

**Gas:** a substance of very low density that has no definite shape or volume.

**Group:** the vertical columns (major classes or divisions) into which elements are arranged in the periodic table of elements. There are three common numbering systems for these groups:

The new IUPAC system, which numbers each column with Arabic numbers from 1 (one) through 18 (eighteen). To reduce confusion caused by the other two systems, this is the system that is used in articles on this web site.

The old IUPAC system, which labeled columns with Roman numerals followed by either the letter 'A' or 'B'. Columns were numbered such that columns one through seven were numbered 'IA' through 'VIIA', columns 8 through 10 were labeled 'VIII A', columns 11 through 17 were numbered 'IB' through 'VIIB' and column 18 was numbered 'VIII'.

The CAS system, which also used Roman numerals followed by an 'A' or 'B'. This method, however, labeled columns 1 and 2 as 'IA' and 'IIA', columns 3 through 7 as 'IIIB' through 'VIB', column 8 through 10 as 'VIII', columns 11 and 12 as 'IB' and 'IIB' and columns 13 through 18 as 'IIIA' through 'VIIIA'.

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Because of the confusion the old IUPAC and the CAS system created, the IUPAC adopted their new system.

Elements are arranged in these groups according to whose properties are similar. All elements in Group 1 for instance are alkali metals. They have only one electron in the outer shell (valence electron) and as a result are highly reactive. Elements in Group 17 are the halogens. They all have seven electrons in the outer orbital (two in level *s* and five in level *p*). They are also very reactive because they have seven electrons in the outer shell and will readily accept an electron in order to reach the ion configuration with the ideal number of eight electrons in the outer shell. Elements Group 18 have a complete outer shell with eight electrons. These noble gases are highly stable and do not react to form compounds under normal conditions.

[← Fahrenheit - Freezing Point](#)  
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[Half-life - Homogeneous →](#)



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## Hazardous Materials Transportation

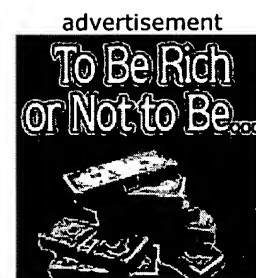
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Exhibit C

| Periodic Table of Elements |          |          |          |           |           |           |           |           |           |            |            |            |          |            |           |            |           |            |
|----------------------------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|----------|------------|-----------|------------|-----------|------------|
| Periods                    | Groups   |          |          |           |           |           |           |           |           |            |            |            |          |            |           |            |           |            |
|                            | 1        | 2        | 3        | 4         | 5         | 6         | 7         | 8         | 9         | 10         | 11         | 12         | 13       | 14         | 15        | 16         | 17        | 18         |
|                            | IA       | IIA      | IIIA     | IVA       | VA        | VIA       | VIIA      | VIIIA     |           |            | IB         | IIB        | IIIB     | IVB        | VB        | VIB        | VIIA      | VIII       |
| 1                          | 1<br>H   |          |          |           |           |           |           |           |           |            |            |            |          |            |           |            |           | 2<br>He    |
| 2                          | 3<br>Li  | 4<br>Be  |          |           |           |           |           |           |           |            |            |            | 5<br>B   | 6<br>C     | 7<br>N    | 8<br>O     | 9<br>F    | 10<br>Ne   |
| 3                          | 11<br>Na | 12<br>Mg |          |           |           |           |           |           |           |            |            |            | 13<br>Al | 14<br>Si   | 15<br>P   | 16<br>S    | 17<br>Cl  | 18<br>Ar   |
| 4                          | 19<br>K  | 20<br>Ca | 21<br>Sc | 22<br>Ti  | 23<br>V   | 24<br>Cr  | 25<br>Mn  | 26<br>Fe  | 27<br>Co  | 28<br>Ni   | 29<br>Cu   | 30<br>Zn   | 31<br>Ga | 32<br>Ge   | 33<br>As  | 34<br>Se   | 35<br>Br  | 36<br>Kr   |
| 5                          | 37<br>Rb | 38<br>Sr | 39<br>Y  | 40<br>Zr  | 41<br>Nb  | 42<br>Mo  | 43<br>Tc  | 44<br>Ru  | 45<br>Rh  | 46<br>Pd   | 47<br>Ag   | 48<br>Cd   | 49<br>In | 50<br>Sn   | 51<br>Sb  | 52<br>Te   | 53<br>I   | 54<br>Xe   |
| 6                          | 55<br>Cs | 56<br>Ba | 57<br>La | 72<br>Hf  | 73<br>Ta  | 74<br>W   | 75<br>Re  | 76<br>Os  | 77<br>Ir  | 78<br>Pt   | 79<br>Au   | 80<br>Hg   | 81<br>Tl | 82<br>Pb   | 83<br>Bi  | 84<br>Po   | 85<br>At  | 86<br>Rn   |
| 7                          | 87<br>Fr | 88<br>Ra | 89<br>Ac | 104<br>Rf | 105<br>Db | 106<br>Sg | 107<br>Bh | 108<br>Hs | 109<br>Mt | 110<br>Uun | 111<br>Uuu | 112<br>Uub |          | 114<br>Uuq |           | 116<br>Uuh |           | 118<br>Uuo |
| 6                          |          |          |          | 58<br>Ce  | 59<br>Pr  | 60<br>Nd  | 61<br>Pm  | 62<br>Sm  | 63<br>Eu  | 64<br>Gd   | 65<br>Tb   | 66<br>Dy   | 67<br>Ho | 68<br>Er   | 69<br>Tm  | 70<br>Yb   | 71<br>Lu  |            |
| 7                          |          |          |          | 90<br>Th  | 91<br>Pa  | 92<br>U   | 93<br>Np  | 94<br>Pu  | 95<br>Am  | 96<br>Cm   | 97<br>Bk   | 98<br>Cf   | 99<br>Es | 100<br>Fm  | 101<br>Md | 102<br>No  | 103<br>Lr |            |

new IUPAC system

old IUPAC system

CAS system